



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/815,920   | 04/01/2004  | James Albert Davis   | 038190/251160       | 9434             |
| 826  | 7590        | 06/16/2006           | EXAMINER            |                  |
| ALSTON & BIRD LLP<br>BANK OF AMERICA PLAZA<br>101 SOUTH TRYON STREET, SUITE 4000<br>CHARLOTTE, NC 28280-4000 |             |                      | RUDE, TIMOTHY L     |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 2883                |                  |

DATE MAILED: 06/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

★

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/815,920 | <b>Applicant(s)</b><br>DAVIS, JAMES ALBERT |  |
|                              | <b>Examiner</b><br>Timothy L. Rude   | <b>Art Unit</b><br>2883                    |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 March 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 16-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 9-14 is/are rejected.
- 7) ☒ Claim(s) 7,8 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election of invention II and species F in the reply filed on 29 March 2006 is acknowledged. Examiner acknowledges claims 1-8 read on elected species F and claims 9-15 are generic to species D, E, and F.

Claims 16-24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 29 March 2006, however, because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### ***Claim Rejections - 35 USC § 103***

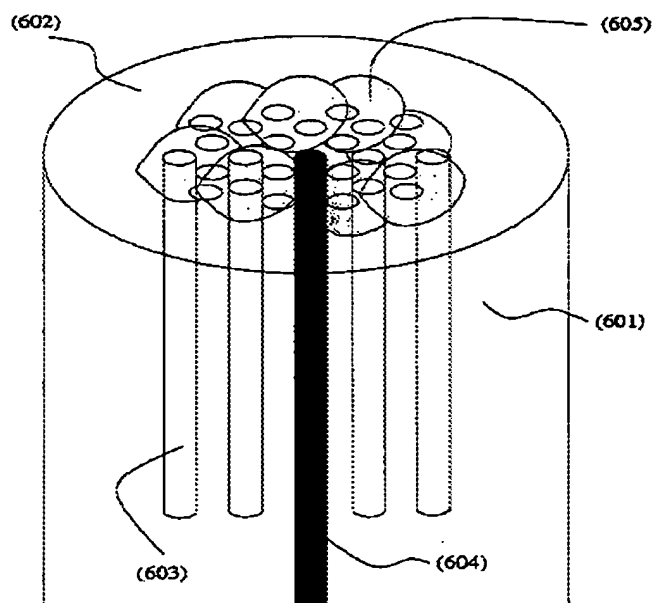
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bjarklev et al (Bjarklev) US PG PUB 2005/0111804 A1 in view of Hollister et al (Hollister) USPAT 6,377,591 B1.

As to claim 1 Bjarklev discloses a system (device) for cooling a fiber amplifier, the system comprising: a fiber amplifier assembly comprising: a longitudinally-extending fiber amplifier; a jacket surrounding the fiber amplifier and extending at least partially longitudinally therealong, wherein the jacket surrounds the fiber amplifier such that the fiber amplifier assembly defines a passage between the jacket and the fiber amplifier for the circulation of coolant therethrough; and a retaining structure disposed within the passage defined by the fiber amplifier assembly for at least partially maintaining a spacing between the fiber amplifier and jacket, e.g., [0148] and [0183].

**Fig. 6**



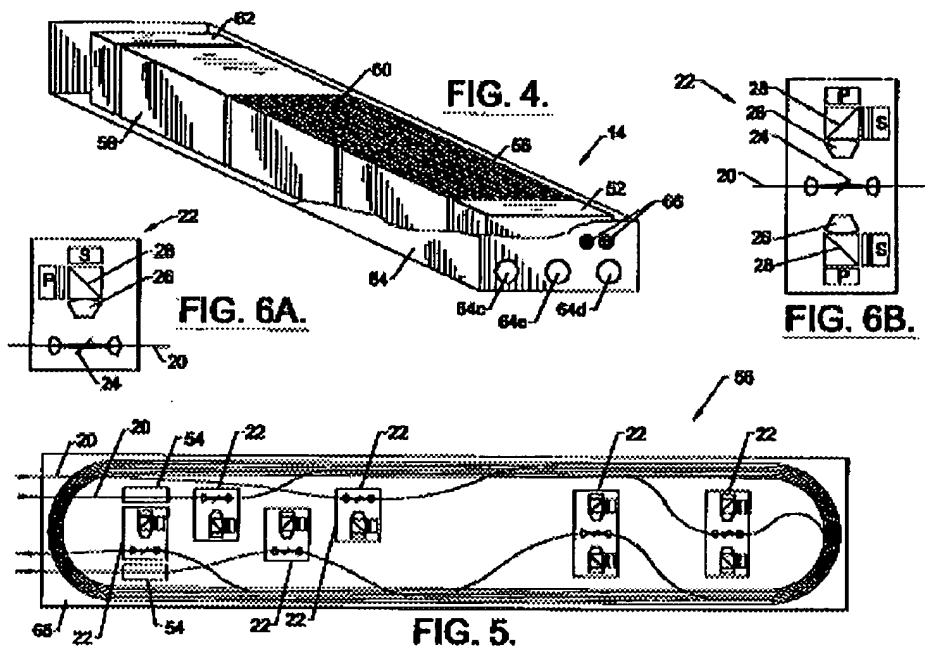
Bjarklev does not explicitly disclose a system wherein the retaining structure and coolant comprise an emulsion of phase change material.

Hollister teaches the use of a micro-encapsulated phase change material [col. 2, line 59 through col. 3, line 4] to improve cooling system performance (better temperature control).

Hollister is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add a phase change material to the retaining structure and the coolant to improve cooling system performance.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Bjarklev with the phase change material of Hollister added to the retaining structure and the coolant to improve cooling system performance.

As to claim 2, Hollister, as combined above, teaches a system according to claim 1 further comprising: a thermal management system capable of circulating coolant through the passage defined between the jacket and fiber amplifier of the fiber amplifier assembly [col. 2, lines 5-25].



As to claim 3, Hollister, as combined above, teaches a system according to claim 2, wherein the thermal management system is capable of placing coolant in thermal communication with the fiber amplifier such that the coolant is capable of carrying heat away from the fiber amplifier, and wherein the thermal management system is capable of rejecting the heat carried away by the coolant [col. 2, line 59 through col. 3, line 4].

As to claim 4, Hollister, as combined above, teaches a system according to claim 3, wherein the thermal management system is capable of placing coolant in thermal communication with the fiber amplifier such that the coolant is capable of at least partially melting to thereby carry heat away from the fiber amplifier, and wherein the thermal management system is capable of condensing at least a portion of the at least

Art Unit: 2883

partially melted coolant to thereby reject the heat carried away by the coolant [col. 2, line 59 through col. 3, line 4].

As to claim 5, Bjarklev, as combined above, teaches a system according to claim 1, wherein the fiber amplifier assembly defines a passage between the jacket and the fiber amplifier for the circulation of coolant selected to have a refractive index smaller than a refractive index of the fiber amplifier [0022] ~ [0025].

As to claim 6, Hollister, as combined above, teaches a system according to claim 1, wherein the emulsion of phase change material comprises a plurality of phase change materials suspended in a carrier fluid, wherein each phase change material comprises an encapsulated composition [col. 2, line 59 through col. 3, line 4].

Claims 9-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bjarklev et al (Bjarklev) US PG PUB 2005/0111804 A1 in view of Hollister et al (Hollister) US PAT 6,377,591 B1 and further in view of Nasiri et al (Nasiri) US PG PUB 2004/0081420 A1.

As to claim 9, Bjarklev in view of Hollister discloses a system (above) for cooling a fiber amplifier, the system comprising: a fiber amplifier assembly comprising: and a longitudinally-extending fiber amplifier capable of being mounted in a serpentine manner through the at least one sheet spacer to thereby maintain separation between

Art Unit: 2883

portions of the fiber amplifier, and to define a passage between the portions of the fiber amplifier for the circulation of coolant therethrough.

Bjarklev in view of Hollister do not explicitly disclose at least one sheet spacer.

Nasiri teaches the use of an apparatus for holding a fiber array in Figure 1

[Applicant's sheet spacer].

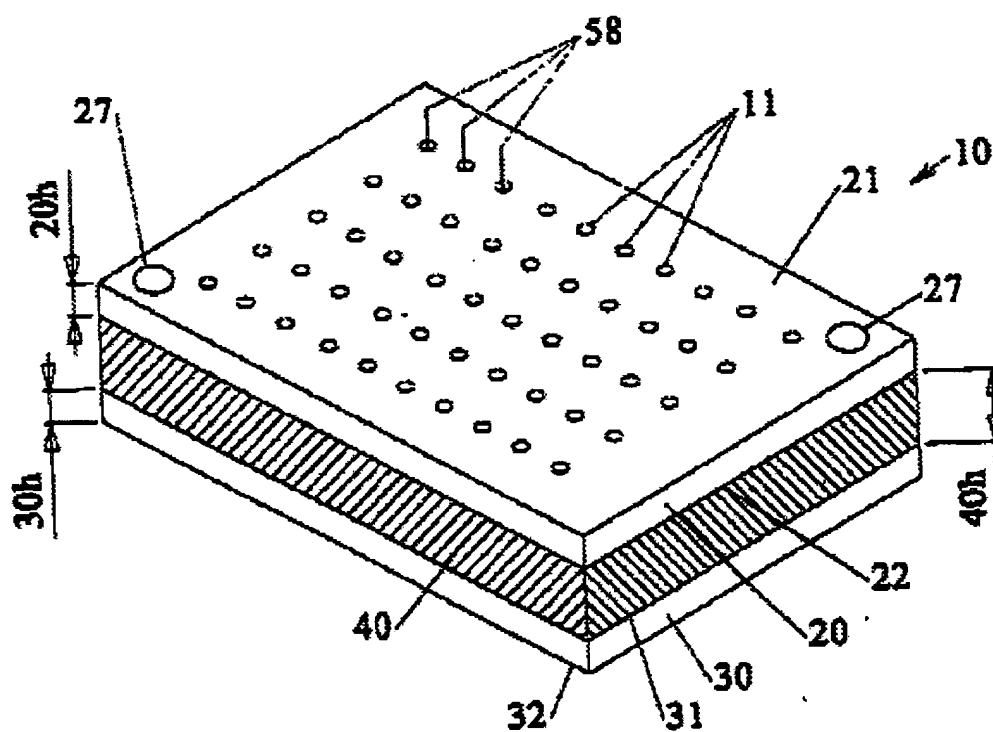


Fig. 1



Nasiri is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add a sheet spacer as a satisfactory means to hold a fiber array.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Bjarklev in view of Hollister with a sheet spacer as a satisfactory means to hold a fiber array.

As to claim 10, Hollister, as combined above, teaches a system according to claim 9 further comprising: a thermal management system capable of circulating coolant through the passage defined between the portions of the fiber amplifier of the fiber amplifier assembly [col. 2, lines 5-25].

As to claim 11, Hollister, as combined above, teaches a system according to claim 10, wherein the thermal management system is capable of placing coolant in thermal communication with the fiber amplifier such that the coolant is capable of carrying heat away from the fiber amplifier, and wherein the thermal management system is capable of rejecting the heat carried away by the coolant [col. 2, line 59 through col. 3, line 4].

As to claim 12, Hollister, as combined above, teaches a system according to claim 11, wherein the thermal management system is capable of placing coolant comprising an emulsion of phase change material in thermal communication with the

fiber amplifier such that the coolant is capable of at least partially melting to thereby carry heat away from the fiber amplifier, and wherein the thermal management system is capable of condensing at least a portion of the at least partially melted coolant to thereby reject the heat carried away by the coolant [col. 2, line 59 through col. 3, line 4].

13. As to claim 3, Bjarklev, as combined above, teaches a system according to claim 9, wherein the fiber amplifier is capable of being mounted in a serpentine manner through the at least one sheet spacer to define a passage between the portions of the fiber amplifier for the circulation of coolant selected to have a refractive index smaller than a refractive index of the fiber amplifier [0022] ~ [0025].

As to claim 14, Hollister, as combined above, teaches a system according to claim 6, wherein the fiber amplifier is capable of being mounted in a serpentine manner through the at least one sheet spacer to define a passage between the portions of the fiber amplifier for the circulation of coolant comprising an emulsion of phase change material [col. 2, line 59 through col. 3, line 4].

### ***Allowable Subject Matter***

Claims 7, 8, and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As to claim 7, relevant prior art of record did not disclose, alone or in combination, the system for cooling a fiber amplifier as claimed comprising phase change materials that are positioned within the passage such that the phase change materials remain at least partially stationary.

As to claim 8, it is dependent upon claim 7 with allowable subject matter above.

As to claim 15, relevant prior art of record did not disclose, alone or in combination, the system according to claim 9, wherein the at least one spacer is embodied in woven fibers positioned to thereby maintain separation between portions of the fiber amplifier, and to define a passage between the portions of the fiber amplifier for the circulation of coolant therethrough.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L. Rude whose telephone number is (571) 272-2301. The examiner can normally be reached on Mon-Thurs.

Art Unit: 2883


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



tlr

Timothy L Rude  
Examiner  
Art Unit 2883



Frank G. Font  
Supervisory Patent Examiner  
Technology Center 2800